

REMARKS

Claims 1-20 are pending in this application. For purposes of expedition, claims 1, 3, 6, 15 and 17 have been amended in several particulars for purposes of clarity and brevity that are unrelated to patentability and prior art rejections in accordance with current Office policy, to clearly define Applicants' disclosed invention and to assist the Examiner to expedite compact prosecution of the instant application.

Specifically, base claims 1, 6 and 15 have been amended to define "a depressurizable transport passage" as expressly defined in dependent claims 3 and 17, and described on page 10, line 7 extending to page 11, line 26 of Applicants' disclosure in order to further clarify several advantages of Applicants' disclosed invention relative to the cited prior art, that is, the change of order of treatment of a wafer sample which has less influence on the order of transport of the sample and, as a result, the time of sample transportation is shortened. Since base claims 1, 6 and 15 only incorporate a feature of their respective dependent claims 3 and 17, entry of the foregoing amendments is proper under 37 C.F.R. §1.116(b) because those amendments simply respond to the issues raised in the final rejection, no new issues are raised, no further search is required, and the foregoing amendments are believed to remove the basis of the outstanding rejections and to place all claims in condition for allowance.

Claims 1, 5-15 and 19-20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Fairbairn, U.S. Patent Publication No. 2002/0155629, in view of Spence et al., U.S. Patent No. 6,106,659 and Komino, U.S. Patent No. 5,769,952 for reasons stated on pages 2-4 of the final Office Action (Paper No. 7)

dated on November 3, 2003. Basically, in support of this rejection, the Examiner cites individual components of Applicants' claimed "semiconductor manufacturing apparatus" from Fairbairn, U.S. Patent Publication No. 2002/0155629, as including, for example,

"an integrated measuring instrument (906A) for pre- or post-measuring the form or size of an element to be formed into a wafer; an etching unit (902) for etching said wafer; an ashing unit (909) for ashing said etched wafer; a wetting unit (911) for wetting said etched wafer; a transport means (904) and 907 whereby the wafers introduced into a cassette (908) are transported one by one successively to said integrated monitoring instrument and each of said working units; and a transport chamber (multiple part numbers –903, 907 and 909) in which said integrated measuring instrument, etching unit, ashing unit, wetting unit and transport means are connected by a depressurizable transport passage (paragraph 55), and which is provided with a wafer cassette inlet (located where cassettes 908 are attached to the transport chamber) for receiving a cassette containing a plural number of sheets of wafer to be etched."

In addition, the Examiner cites Spence et al., U.S. Patent No. 6,106,659 for disclosing "the etching unit as generating plasma under a reduced pressure [see Abstract]" and Komino, U.S. Patent No. 5,769,952 for allegedly disclosing the use of "a drying chamber as part of the semiconductor manufacturing apparatus [see column 6, lines 7-22]."

In support of this rejection, the Examiner has completely ignored critical features of Applicants' base claims 1, 6 and 15 in which the etching unit, the ashing unit, the wetting unit and the integrated measuring instrument, are expressly defined in the "order of treatment" so that "the etched wafer is ashed and then subjected to the wetting treatment, or the etched wafer is wetted and then subjected to an ashing treatment, and afterwards, the etched wafer is again measured by the integrated measuring instrument." These features are novel and serve as the basis for

patentability of Applicants' disclosed invention, in which, depending upon the treatment to be effected, it can be chosen whether the etched wafer is ashed and then subjected to wetting treatment, or the etched wafer is wetted and then subjected to ashing treatment. These features enable Applicants' base claims 1, 6 and 15 to advantageously avoid defects that, when ashing is effected previously, the protection film on a side wall of an element (structure) on the wafer is hardened, and the hardened film cannot be peeled at the wetting treatment effected thereafter, as described on page 14, lines 1-6 of Applicants' specification.

The legal basis for the Examiner to ignore Applicants' novel features regarding the "order of treatment" is outlined on pages 3-4 of the final Office Action (Paper No. 7). Specifically, the Examiner asserts that the courts have ruled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claims. Ex Part Masham, 2 USPQ 1647 (Bd. Pat. App. & Inter. 1987). In addition, on page 6 of the final Office Action (Paper No. 7), the Examiner incorrectly analogizes that the "order of treatment" feature is nothing more than an intended use of the claimed invention and, for such an intended use to be considered, a structural difference between the claimed invention and the prior art must be shown. According to the Examiner, "if the prior art structure is capable of performing the intended use then it meets the claim." In re Casey, 152 USPQ 235 (CCPA 1967) and In re Otto, 136 USPQ 458, 459 (CCPA 1963).

However, the line of case law cited by the Examiner, including: Ex Part Masham 2 USPQ 1647 (Bd. Pat. App. & Inter. 1987), In re Casey, 152 USPQ 235

(CCPA 1967) and In re Otto, 136 USPQ 458, 459 (CCPA 1963), is misplaced.

Likewise, the Examiner's characterization of Applicants' claimed "order of treatment" features as an intended use is clearly flawed and factually incorrect. As a result, Applicants traverse the rejection and respectfully request the Examiner to reconsider and withdraw this rejection for the following reasons.

First of all, base claims 1 and 6 expressly define the "order of treatment" between the integrated measuring instrument, the etching unit, the ashing unit, the wetting unit and the drying unit so that "the etched wafer is ashed and then subjected to the wetting treatment, or the etched wafer is wetted and then subjected to an ashing treatment, and afterwards, the etched wafer is again measured by the integrated measuring instrument."

Likewise, base claim 15 also defines, *inter alia*:

"depending upon an order of treatment, the wafer after etching is ashed, via the ashing unit, and then subjected to wetting, via the wetting unit, or, alternatively, the wafer after etching is wetted, via the wetting unit, and then subjected to ashing, via the ashing unit, and afterwards, the structure on the wafer is again measured at the optical measuring instrument for any abnormality such that the etching condition can be optimized for measurement of a next wafer in the batch placed in the wafer cassette."

As expressly defined in each of Applicants' base claims 1, 6 and 15, and as previously discussed, depending upon the treatment to be effected, it can be chosen whether the etched wafer is ashed and then subjected to wetting treatment, or the etched wafer is wetted and then subjected to ashing treatment.

The specific "order of treatment" features of Applicants' base claims 1, 6 and 15 are **not** an intended use as alleged by the Examiner. Rather, these features require specific arrangement of the working units, and are critical to advantageously

enable Applicants' claims 1, 6 and 15 to avoid defects that, when ashing is effected previously, the protection film on a side wall of an element (structure) on the wafer is hardened, and the hardened film cannot be peeled at the wetting treatment effected thereafter, as shown in FIG. 1, FIG. 3, FIG. 5 and described on page 14, lines 1-6 of Applicants' specification.

The line of case law cited by the Examiner, including: Ex Part Masham 2 USPQ 1647 (Bd. Pat. App. & Inter. 1987), In re Casey, 152 USPQ 235 (CCPA 1967) and In re Otto, 136 USPQ 458, 459 (CCPA 1963), is misplaced because these cases refer to situations where a claimed apparatus and a cited prior art apparatus are the same and the only difference there between is an intended use of the claimed apparatus. In those situations, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does **not** differentiate the claimed apparatus from a prior art apparatus satisfying the structural limitations of that claimed.

For example, in Ex Part Masham 2 USPQ 1647 (Bd. Pat. App. & Inter. 1987), both the claimed apparatus and the cited prior art apparatus describe an apparatus for mixing flowing developer material, including "a chamber for receiving the flowing developer material" and "stationary mixing means for mixing the flowing developer material." The only difference between the claimed apparatus and the cited prior art apparatus is that the claimed apparatus has an intended use limitation for the "stationary mixing means", that is, the "stationary mixing means" is to be used "completely submerged in the developer material", relative to "only being partially submerged in the developer material" as used by the cited prior art apparatus. In such a situation, the Board of Patent & Appeals correctly held that the recitation

"completely submerged in the developer material" does **not** impose any structural limitations upon the claimed apparatus which differentiates it from that disclosed by the cited prior art apparatus.

In contrast to Ex Part Masham, however, Applicants' base claims 1, 6 and 15 do **not** contain any intended use clause. Rather, Applicants' base claims 1, 6 and 15 expressly requires a specific arrangement of the integrated measuring instrument, the etching unit, the ashing unit, the wetting unit and the drying unit such that "the etched wafer is ashed and then subjected to the wetting treatment, or the etched wafer is wetted and then subjected to an ashing treatment, and afterwards, the etched wafer is again measured by the integrated measuring instrument." Such a specific arrangement and order of treatment of samples (wafers), the change of the order to treatment of samples has a less influence on the order of transport of samples (wafers), and time of transport of samples is shortened.

Therefore, in view of the foregoing explanations and the Examiner's previous misunderstanding of key features of Applicants' base claims 1, 6 and 15, Applicants respectfully request that the rejection of Applicants' base claims 1, 6 and 15 and their respective dependent claims 2-5, 7-14 and 16-20 be withdrawn.

To the extent that the substance of the Examiner's proposed combination of Fairbairn, U.S. Patent Publication No. 2002/0155629, Spence et al., U.S. Patent No. 6,106,659 and Komino, U.S. Patent No. 5,769,952 may still be applicable, Applicants request that the combination rejection be withdrawn for reasons discussed herein below.

In contrast to Applicants' base claims 1, 6 and 15, Fairbairn '629, as a primary reference, discloses an apparatus, as shown in FIGs. 9A-9B, for monitoring and

controlling critical dimensions of features formed on a wafer through feedback and feedforward of information gathered during in-process inspection of the features. As shown in FIG. 10, a sequence of steps used involves (1) transfer a wafer from cassette to CD measurement tool at block 1020; (2) measure CD and align wafer at block 1030; (3) select etch recipe based on CD measurement at block 1040; transfer the wafer to an etcher at block 1050; etch the wafer using selected etch recipe at block 1060; transfer the wafer to the measuring tool at block 1070; measure the CD of a feature on the wafer at block 1080; and then transfer the wafer back to the cassette at block 1090.

There is **no** disclosure from Fairbairn '629 of Applicants' feature "depending upon an order of treatment, the etched wafer is ashed and then subjected to the wetting treatment, or the etched wafer is wetted and then subjected to an ashing treatment, and afterwards, the etched wafer is again measured by the integrated measuring instrument" as defined in each of Applicants' base claims 1, 6 and 15.

As secondary references, neither Spence '659 nor Komino '952 can remedy the noted deficiencies of Fairbairn '629 in order to arrive at the subject matter of Applicants' base claims 1, 6 and 15. For example, Spence '659 is only cited for disclosing the use of moderate-to-high pressure plasma discharges for treating materials. Likewise, Komino '952 is only cited for disclosing the use of reduced pressure in a treatment chamber.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to modify the reference or to combine reference teachings.

Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and **not** based on Applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2143. In other words, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." ACS Hospital System, Inc v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). The Examiner must point to something in the prior art that suggests in some way a modification of a particular reference or a combination of references in order to arrive at Applicants' claimed invention. Absent such a showing, the Examiner has improperly used Applicants' disclosure as an instruction book on how to reconstruct to the prior art to arrive at Applicants' claimed invention.

In the present situation, Fairbairn '629, Spence '659, and Komino '952 fail to disclose and suggest all features of Applicants' base claims 1 and 8. Therefore, Applicants respectfully request that the rejection of claims 1 and 8 and their respective dependent claims be withdrawn.

Claims 2 and 16 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Fairbairn, U.S. Patent Publication No. 2002/0155629, Spence et al., U.S. Patent No. 6,106,659 and Komino, U.S. Patent No. 5,769,952 as applied to claims 1, 5-15 and 19-20, and further in view of Edwards, U.S. Patent No. 6,042,623

for reasons stated on page 4 of the final Office Action (Paper No. 7). Claims 3 and 17 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Fairbairn, U.S. Patent Publication No. 2002/0155629, Spence et al., U.S. Patent No. 6,106,659 and Komino, U.S. Patent No. 5,769,952 as applied to claims 1, 5-15 and 19-20, and further in view of Imahashi, U.S. Patent No. 5,695,564 for reasons stated on page 5 of the final Office Action (Paper No. 7). Lastly, claims 4 and 8 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Fairbairn, U.S. Patent Publication No. 2002/0155629, Spence et al., U.S. Patent No. 6,106,659 and Komino, U.S. Patent No. 5,769,952 as applied to claims 1, 5-15 and 19-20, and further in view of Watanabe, JP 2000173530 for reasons stated on page 5 of the final Office Action (Paper No. 7). Since the correctness of the rejections of the dependent claims is predicated upon the correctness of the rejection of Applicants' base claims, Applicants respectfully traverse these rejections, based primarily for the reasons discussed against the rejection of claims 1, 5-15 and 19-20 under 35 U.S.C. §103(a) as being unpatentable over Fairbairn, U.S. Patent Publication No. 2002/0155629, Spence et al., U.S. Patent No. 6,106,659 and Komino, U.S. Patent No. 5,769,952.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

INTERVIEW:

In the interest of expediting prosecution of the present application, Applicants respectfully request that an Examiner interview be scheduled and conducted. In accordance with such interview request, Applicants respectfully request that the Examiner, after review of the present Amendment, contact the undersigned local Washington, D.C. area attorney at the local Washington, D.C. telephone number (703) 312-6600 for scheduling an Examiner interview, or alternatively, refrain from issuing a further action in the above-identified application as the undersigned attorneys will be telephoning the Examiner shortly after the filing date of this Amendment in order to schedule an Examiner interview. Applicants thank the Examiner in advance for such considerations. In the event that this Amendment, in and of itself, is sufficient to place the application in condition for allowance, no Examiner interview may be necessary.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 500.41253X00), and please credit any excess fees to said deposit account.

Respectfully submitted,
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